Institutional Causes of Macroeconomic Volatility

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Abstract

We investigate the relation between the quality of institutions and macroeconomic volatility. Using instrumental variable regressions, we show that higher barriers to entry lead to higher volatility: A one standard deviation increase in entry costs increases the standard deviation of output growth by roughly 40% of its average value in our sample. To the contrary, property rights protection has no statistically significant effect on volatility.

KEYWORDS: entry costs, entry regulation, entry barriers, property rights, institutions, volatility.

JEL CLASSIFICATION: O11, O17, O43.

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1 Introduction

Poor macroeconomic policies in less developed countries have been blamed for the negative relationship between growth and macroeconomic volatility. Acemoglu, Johnson, Robinson, and Tchaicharoedn (2003) offer a different explanation: Volatility is related to institutional quality; once institutions are controlled for, macroeconomic policies (i.e., fiscal, monetary, and exchange rate policy) have only a minor effect on volatility. This finding raises a question of how exactly institutions affect output volatility, more precisely, which institutional features are most responsible for the relation documented by Acemoglu, Johnson, Robinson, and Tchaicharoedn (2003). We use instrumental variables (IV) regressions to disentangle the effect of two distinct types of institutions: entry barriers and property rights protection. We find that higher entry barriers lead to higher output volatility. To the contrary, property rights protection appears to have no effect on output volatility.

In the data entry barriers and property rights protection are correlated, although their economic effects, both empirically and theoretically, are quite different. Barseghyan (2008) shows that worse property rights protection leads to a lower educational attainment and a lower capital-output ratio: A lack of property rights enforcement discourages investment in all types of capital. The effect of property rights on total factor productivity (TFP) is much weaker and is mostly statistically insignificant. On the other hand, entry costs have no effect on the capital-output ratio, but have a strong effect on TFP. According to prevalent theories of industry structure (e.g., Hopenhayn, 1992) this is exactly what one should expect: higher entry barriers reduce entry, protect incumbent firms, and allow those with lower productivity to survive. Thus, the results of our paper suggest that differences in output volatility are driven by industry structure, which, in turn, is significantly affected by entry barriers. This is consistent with the findings of Acemoglu, Johnson, Robinson, and Tchaicharoedn (2003) that a significant part of the effect of institutions on economic outcomes occurs via microeconomic channels.

In related papers, we explore the link between entry costs and cross-country output and TFP differences, and between entry barriers and output volatility through the lenses of

general equilibrium models. Barseghyan, DiCecio, and Tsyrennikov (2009) show how the link between entry barriers and output volatility can arise in a general equilibrium model. When there are no entry barriers, only the highest productivity firms are operating, and, thus, a positive technology shock does not alter the industry structure. However, when there are entry barriers a positive shock induces more entry, increases competition, and forces low productivity firms to exit. As a result firms' average productivity increases, magnifying the effect of a positive aggregate shock. Barseghyan and DiCecio (2009) construct a model with endogenous entry and operation decisions by firms and calibrate it to match the U.S. distribution of firms by age and size. Higher entry costs lead to greater misallocation of productive factors and lower steady-state TFP and output. As in the data, higher entry costs are associated with higher mean and variance of the employment distribution across firms.

In our investigation, we use a measure of entry costs originally constructed by Djankov, La Porta, Lopez de Silanes, and Shleifer (2002) and later expanded by The World Bank (2007). Unlike most measures of institutional quality, this is a continuous variable capturing the precise quantitative value of the object of interest. We control for property rights by considering five proxies for property rights institutions: the rate of debt recovery from a "going-out-of-business" borrower, three indices of property rights protection, and a social infrastructure measure. Sources of exogenous variation in entry costs and the property rights measures are given by the following instruments: geographical latitude and the fraction of population speaking a major European language; the country's legal origin; European settler mortality in early stages of colonization, and indigenous population density in the early sixteenth century.

The IV regressions reveal that entry costs have a statistically significant effect on output volatility. The economic effect of entry costs is worth emphasizing. A one standard deviation increase in entry costs is estimated to increase the standard deviation of the growth rate of output per worker by 41% of its average value in our sample. Also, a one standard deviation increase in entry costs increases the magnitude of the worst output drop by 60% of its sample

average.

We perform a variety of checks to insure that the estimated strong effect of entry costs on volatility is robust. Notably, we entertain the possibility raised by Glaeser, La Porta, Lopez de Silanes, and Shleifer (2004) that the defining characteristic of a successful European settlement was an increase in human capital. We include human capital as an endogenous variable in the IV regressions. The robustness exercises confirm that entry costs are an important determinant of output volatility. Moreover, the magnitude of this effect is close to the one estimated in the benchmark regressions. The effect of property rights on volatility remains insignificant throughout robustness analysis.

This paper belongs to the empirical literature on institutions and growth, such as Hall and Jones (1999), Acemoglu, Johnson, and Robinson (2002); Acemoglu, Johnson, Robinson, and Tchaicharoedn (2003), Dollar and Kraay (2003), Easterly and Levine (2003), Rodrik, Subramanian, and Trebbi (2004) and earlier contributions by Knack and Keefer (1995) and Mauro (1995). The empirical strategy employed in the paper is closest to that of Acemoglu and Johnson (2005) and Barseghyan (2008). As in these papers, our analysis hinges upon availability of a set of instruments that affect current economic outcomes only through institutions and are capable of separating out the effects of various institutional features.

Our findings suggest that entry costs, by affecting the composition of the pool of firms, impact volatility. Comparably, Koren and Tenreyro (2007) highlight the importance of the sectorial composition in understanding the relationship between development and volatility. Kraay and Ventura (2007) argue that comparative advantage determines differences in the composition of firms between rich and poor countries, making least developed countries more volatile.

The rest of the paper is organized as follows. Section 2 presents the data and methodology used to carry out the empirical investigation. We present the results of the empirical investigation in Section 3 and discuss their robustness in Section 4. We conclude in Section 5. An Appendix provides data sources and definitions.

2 Data and Methodology

2.1 Output Volatility

The benchmark measure of volatility is constructed using purchasing power adjusted GDP per worker data from the Penn World Tables 6.2 constructed by Heston, Summers, and Aten (2006). We consider only countries for which the data for output per worker is available at least for twenty years and entry costs data are available.[1] Our benchmark measure of volatility is the standard deviation of the growth rate of output per worker. To assess the robustness of our results, we will also consider the worst output drop, i.e., the minimum growth rate of output per worker. For comparison purposes, we also construct the average growth rate for each country and report descriptive statistics of it.

2.2 Entry Costs, Property Rights and Social Infrastructure

Entry costs come from the World Bank's *Doing Business* data set and are available for 132 countries.[2] They include all official fees and dues that an entrepreneur must pay in the process of completing legal procedures for starting a new firm. They are constructed for a "standardized" firm. Though this standardized firm is of a relatively small size, it is quite representative of a typical firm, because smaller production units have a very large share of aggregate employment.[3]

In most developed countries, entry costs are not a significant burden on entrepreneurs: For example, in Canada entrepreneurs have to pay less than 1% of GNI per capita in entry costs

[1] Notice that for different countries volatility, average growth, and worst out drop are computed for different time periods. Our results are robust to the use of the same sample for all countries, e.g., 1961-2003.

[2] We consider only countries for which both volatility and entry costs data are available.

[3] In a sample of OECD countries, for which harmonized firm level data are available, the employment share of the firms with less than 50 workers is very substantial, about one-third of the total. In less developed and developing countries, which constitute a large part of our sample, the employment share of smaller establishments is much larger than in the developed countries, typically more than 60% of the total (see Tybout, 2000).

whereas the cross-country average is 79% of GNI per capita. Higher entry costs are associated with worse macroeconomic conditions along several dimensions (see Table 1 and Figures 1-3). Entry costs are positively correlated with volatility and negatively correlated with average growth. Also, higher entry costs are associated with more severe crises, measured by the worst output drop.

A proxy for property rights protection is more challenging. The first variable that we use is the rate of debt recovery from a "going-out-of-business" borrower. This is, to our knowledge, the only available quantitative measure that can proxy property rights protection. The second variable, "constraint on executive power," refers to "the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectivities" (Jaggers and Marshall, 2000). It can be used as a proxy for the protection of private citizens and businesses against expropriation by executive power. However, it may be ignoring the risk of expropriation by other agents. The third variable is the property rights protection index constructed by the The Heritage Foundation (2006). The fourth variable is the "expropriation risk" constructed by the Political Risk Services (1999). It measures the risk of expropriation of private foreign investment by the government.[4] Finally, we consider the social infrastructure measure proposed by Hall and Jones (1999): It was constructed as the average between the government anti-diversion policy index and the openness to international trade measure of Sachs and Warner (1995).

All property rights measures and social infrastructure are strongly positively correlated with each other and are negatively correlated with output growth volatility. They are negatively correlated with entry costs (see Table 1).

[4] Acemoglu and Johnson (2005) use constraint on executive, the Heritage Foundation index and expropriation risk to proxy for property rights. Their preferred measure is constraint on executive, because it conceptually refers to constraints directly imposed on government actions. The other variables are equilibrium outcomes driven by policies that may result from such constraints.

2.3 The Econometric Model

The target is to identify and estimate the following relation:

$$Y_i = \gamma_0 + \gamma_E E_i + \gamma_O O_i + Z_i' \gamma_Z + \varepsilon_i,$$

where Y_i is the volatility of output growth for country i, E_i is the measure of entry costs, O_i is the proxy for other institutions, Z_i is the vector of additional controls, and ε_i is the error term. Because of potential endogeneity, omitted variable bias and measurement error, an instrumental variable procedure is implemented. Recall that for the validity of an IV regression the following two assumptions must be satisfied:

(A1) The instruments should satisfy the rank condition: $rank\ \mathbb{E}([1 \quad I \quad Z]'[1 \quad E \quad O \quad Z]) = 3 + z$, where I denotes the vector of instruments, and z is the number of additional controls; and

(A2) The instruments should be uncorrelated with the error term ε_i.

2.4 Instruments

From the set of instruments available in the literature, we use geographic latitude, the fraction of population speaking a major European language, legal origin, and, for a sub-sample of ex-colonies, European settler mortality and indigenous population density.

The first two instruments come from Hall and Jones (1999), who argued that geographical characteristics and the extent to which major European languages have been adopted in a country are correlated with the quality of the country's institutions. This is because Europeans were more likely to settle and establish Western institutions in places where the geographic characteristics were more similar to those in their origin countries, and because the extent to which European culture and, consequently, European institutions have spread in a country is likely to be correlated with the adoption of European languages.

Legal origin (La Porta, Lopez de Silanes, Shleifer, and Vishny, 1999) has a strong effect on various institutional features related to property rights, most notably on the degree of

legal formalism which is associated with judicial transparency and fairness, corruption and enforceability of contracts.

Settler mortality and population density, introduced by Acemoglu, Johnson, and Robinson (2002); Acemoglu, Johnson, Robinson, and Tchaicharoedn (2003) can be used as instruments because of their lasting effects on countries' institutional development. Early European settlements were negatively affected by high mortality rates. In places where Europeans were settling in large numbers, it was in their interest to promote free entrepreneurship, provide property rights protection, etc. Higher indigenous population density, on the other hand, provided Europeans with an opportunity to capture and exploit local labor, giving rise to extractive institutions and, therefore, poor property rights protection. Higher population density should not necessarily lead to higher entry barriers. In fact, as shown in the next section of the paper, the data reveals the opposite: population density has a negative effect on entry costs.

We do not use the fraction of population speaking English or the predicted measure of trade shares (Frankel and Romer, 1999), which have been used by Hall and Jones (1999). They have no predictive power for entry costs or property rights measures, once the five instruments described above are controlled for. Therefore, they are not relevant for our analysis.

Because of data availability, the regressions below rely on samples of different sizes. The largest sample consists of 123 countries.

2.5 Moments of the Distribution of Firms by Size

In Table 1, we also report statistics for the mean and the variance of the distribution of firms by size, based on Alfaro, Charlton, and Kanczuk (2009). Higher volatility is associated to a lower density of firms (i.e., a larger average firm size) and to more heterogeneity in firms' sizes (i.e., a higher variance of the distribution of firms by size). The first two moments of the distribution of firms by size are negatively related to measures of institutional quality and positively correlated to entry costs (see Figures 4 and 5).

3 Results

3.1 Preliminaries: Endogenous Regressors and Instruments

As a starting point we aim to identify the minimum number of instruments that would allow us to separately identify the effect of entry costs and the effect of property rights on output volatility.

Table 2 presents the results of the OLS regressions of the endogenous regressors on all available instruments. In Column 1, entry costs is the dependent variable. In Columns 2 to 5, the dependent variables are the proxies for the property rights protection. In Column 6, social infrastructure is the dependent variable.

The table reveals differences between correlation patterns of institutional variables with instruments; these differences guide our initial choice of instruments. First, the European languages variable has an effect on entry costs, but no statistically significant effect on the debt recovery rate, the Heritage Foundation index, expropriation risk or social infrastructure. On the other hand, legal origin has no effect on entry costs, but has an effect on the debt recovery rate, the Heritage Foundation index, expropriation risk and social infrastructure. This suggests that IV regressions which use only legal origin and the European languages variable as instruments might achieve identification. A natural advantage of these regressions is that they do not involve population density or settler mortality and therefore can be implemented on the full sample rather than the sub-sample of ex-colonies.

Second, while the population density has the expected negative effect on property rights measures and social infrastructure, its effect on entry costs is of a wrong sign.[5] Settler mortality has the expected negative effect on all endogenous regressors. Neither of these two variables has a statistically significant effect on constraint on executive. Because the latter is correlated with the European languages variable and latitude, we consider IV regressions which use population density, settler mortality and the European languages variable (or latitude) as instruments.

[5] That is, higher population density implies lower entry barriers.

In each of the following IV regressions we formally test whether the rank condition (A1) is satisfied. In addition, when the number of instruments exceeds the number of endogenous regressors, we perform a test for over-identifying restrictions.

3.2 Main Results

Our preliminary regressions are carried out with two instruments: legal origin and the European languages variable. The results of these regressions are reported in Columns 1-3 of Table 3A. In the regressions reported in Column 1 property rights are proxied by the debt recovery rate, in Column 2 - by the Heritage Foundation Index, and in Column 3 - by social infrastructure.

We report three numbers for each instrumented variable: the coefficient, the heteroskedasticity robust standard error and the corresponding p-value. To save space, the intercept is not reported. We also report the p-value of Cragg and Donald's insufficient rank test (see Cragg and Donald, 1993). The null of this test is that the rank is insufficient. The rejection of the test provides confidence that the rank condition (A1) is satisfied. The number of observations is reported last.

As Columns 1-3 show, entry costs have a statistically significant negative effect on volatility. However, the null of Cragg and Donald's test is not rejected in all but one regression,[6] implying that the instruments are not well suited to separately identify the effect of entry costs and property rights. For robustness, we also report the results of these regressions when latitude is used as an instrument instead of European languages (Columns 4-6). While the results are similar to those reported in Columns 1-3, the p-values of the entry costs coefficient and of Cragg and Donald's test are larger. This is expected given that neither legal origin nor latitude are strongly correlated with entry costs.

Our benchmark regressions utilize three instruments: settler mortality, population density and the European languages variable. In Table 3B, Columns 1-5, we report the results for

[6]The regressions with constraint on executive and expropriation risk are not reported, because their p-values of Cragg and Donald's test are very high.

all five proxies of property rights protection. The effect of entry costs in all these regressions is negative and statistically significant. Its magnitude is close to that reported in Table 3A. Property rights or social infrastructure have no statistically significant effect in any of these regressions. The null of Cragg and Donald's test is rejected once at the 1% level, twice at the 5% level and twice at the 10% level. The null of the Hansen-Sargan over-identification test,[7] which is that the exclusion restriction (A2) holds, is not rejected in any of these regressions. This lends credibility to the validity of the instruments. In Columns 6-10 of Table 3B, we repeat these regressions, but use latitude rather than European languages as an instrument. The results of these regressions are similar to those reported in Columns 1-5, but as indicated by the p-values of Cragg and Donald's test, this set of instruments is weaker.

3.3 Economic Significance of Entry Barriers

The results described above suggest that entry barriers have a significant effect on output volatility. The average value of the entry costs coefficient in the ten regressions reported in Table 3B is 1.85. This implies that an increase in entry costs by one standard deviation in our sample, results in a 2.5 percentage point increase in the standard deviation of the growth rate of output, which is roughly 41% of its mean value in our sample.

3.4 Entry Costs and Industry Structure

A structural interpretation of our results relies on the seminal work of Hopenhayn (1992). Costlier entry leads to less competition and a lower number of operating firms. With the protection from potential entrants afforded by high entry costs, low productivity firms can survive and operate. This implies that operating firms are more heterogenous, i.e., a higher dispersion of firms' productivity.[8] This mechanism magnifies the volatility stemming from aggregate uncertainty. In the data, the lower density of operating firms and the higher heterogeneity in firms's size are associated to higher macroeconomic volatility (Figures 4

[7] See Sargan (1958) and Hansen (1982); see Hayashi (2000) for a textbook treatment.

[8] See Barseghyan and DiCecio (2009) for a derivation of this result in a general equilibrium setting.

and 5). Unfortunately, the paucity of data prevents us from analyzing directly the empirical relationship between entry costs and industry structure in this paper. We leave this task for future research.

4 Robustness

4.1 Increased Human Capital and European Influence

Since settler mortality, population density, and latitude determined early European settlement decisions, one might argue that human capital could be the omitted variable driving the results because "what [Europeans] brought with them is themselves, and therefore their know-how and human capital" (Glaeser, La Porta, Lopez de Silanes, and Shleifer, 2004).[9] These authors also show that the levels of educational attainment are persistent, implying that the instruments should be correlated not only with past but also with current levels of human capital. One strategy to deal with this problem is to include human capital in the IV regressions. In the regressions reported in Column 1 of Table 4 the endogenous regressors are entry costs and current human capital and they are instrumented by settler mortality and population density. The entry costs coefficient is significant and close in magnitude to those in the benchmark regressions. Human capital is not significant. The null of the insufficient rank test is rejected at the 5% level.

Columns 2 and 3 show the regressions in which the debt recovery rate and constraint on executive are added as the third regressor, respectively. In Column 2 the additional instrument is legal origin and in Column 3 it is the European languages variable.[10] In these regressions entry costs remain statistically and economically significant. Property rights

[9] A similar argument might apply to the European languages variable, because it could be capturing the spread of European human capital.

[10] This choice of instruments stems naturally from the correlation patterns reported in Table 2 because the debt recovery rate is correlated with legal origin and is not correlated with the European languages variable. Conversely, constraint on executive is not correlated with legal origin and is correlated with European languages.

measures have no statistically significant effect on output volatility. The null of Cragg and Donald's test is rejected once at the 5% level and once at the 10% level.

4.2 Corruption

We consider the possibility that corruption is an omitted endogenous regressor. This consideration is motivated by Djankov, La Porta, Lopez de Silanes, and Shleifer (2002) who present evidence that higher entry barriers are associated with higher levels of corruption. From an econometric point of view, because corruption is correlated with entry costs, its omission from the regressions may result in biased estimates of the effect of entry costs on economic outcomes. However, it is likely that corruption itself is a cause of poor property rights institutions, in particular, less constraint on executive and political power. Therefore, inclusion of property rights measures as regressors in the benchmark regressions may mitigate the potential bias in the entry costs coefficients. Moreover, corruption is explicitly taken into account in the construction of the Heritage Foundation's property rights protection index and the social infrastructure measure of Hall and Jones (1999). We further explore this issue by including corruption (as constructed by (La Porta, Lopez de Silanes, Shleifer, and Vishny, 1999) in the IV regressions as an additional regressor (see Table 5). In the first regression the endogenous regressors are entry costs and corruption, and they are instrumented by settler mortality and population density. The entry costs coefficient is significant and close in magnitude to that in the benchmark regressions. The null of the insufficient rank test is rejected at the 1% level.

Columns 2 and 3 of Table 5 present regressions in which the debt recovery rate and constraint on executive are added as the third regressor, respectively. Additional instruments are legal origin and the European languages variable, respectively. The entry costs coefficient in both regressions is economically significant. It is statistically significant in the regression with constraint on executive but not with the debt recovery rate. Property rights measures remain statistically insignificant. The null of Cragg and Donald's test is rejected in the regression with the debt recovery rate at the 10% level and in the regression with constraint

on executive - at the 5% level.

4.3 Entry Regulation versus Business Regulation

It could be the case that the significance of entry costs in the IV regressions reflects the importance of business regulation in general, rather than entry barriers per se. An attempt to disentangle entry costs from the rest of business regulation would require a proper measure of the latter. An index which comes close to such a measure is the one constructed by the Heritage Foundation and previously used by La Porta, Lopez de Silanes, Shleifer, and Vishny (1999). This index measures the difficulty for "entrepreneurs to create and/or maintain new businesses."[11]

We include business regulation as an endogenous regressor and carry out the same set of regressions as in the case of human capital and corruption (see Table 6). The results are very close to those in the case in which corruption is included as an endogenous regressor. This could be due to the fact that corruption within the bureaucracy is one of the variables that the Heritage Foundation takes into account when constructing its measure of business regulation. In our sample, the correlation between the latter and the corruption variable is 0.49.

4.4 Over-Identification

In all of the robustness exercises described above it is possible to test for over-identification by including latitude as an additional instrument. Doing so does not change significantly the magnitude or statistical significance of the entry costs coefficients. The null of the over-identification test is not rejected in any of these regressions.[12]

[11] There is a clear overlap between entry costs and this index, because the latter includes the difficulty in starting a new business.

[12] To save space, the regression tables are not reported. They are available upon request.

4.5 Semi-Reduced Form Regressions

Because we are particularly interested in singling out the effect of entry costs, we employ semi-reduced form regressions as an alternative to our benchmark regressions. In these regressions all instruments are included as explanatory variables, except one which is necessary to instrument entry costs. Such a specification aims to identify the effect of entry costs while capturing directly the total effect of the included instruments on economic outcomes. As such, it does not rely on the exact mechanisms through which included instruments affect economic outcomes.

We start with semi-reduced form regressions in which the explanatory variables are entry costs (instrumented by the settler mortality), and population density. The results of these regressions are described in Column 1 of Table 7A. In Column 2 of this table we report the same regressions, but with European languages as an additional included instrument; in Column 3 - latitude; and in Column 4 - European languages and latitude. The regressions confirm our earlier findings that entry costs are an important determinant of output volatility. Indeed, the entry costs coefficients are statistically significant and their values are close to the ones reported in Tables 3B. Notably, none of the included instruments is statistically significant. The null of Cragg and Donald's test is rejected at the 1% level in all regressions.

We also perform regressions identical to those reported in Table 7A, except that the European languages variable is now used as a regressor and settler mortality is used as the instrument for entry costs (see Table 7B). The results are very close to those reported in Table 7A. The p-values of Cragg and Donald's test are slightly higher than in Table 7A and so are the p-values of the entry costs coefficient. None of the included instruments is statistically significant.

Recall from Table 2 that the variation in entry costs is explained only by two instruments: European languages and settler mortality.[13] Tables 7A and 7B show that when controlling for entry costs instrumented by one of these variables, the other variable has no independent

[13]The population density coefficient in the entry costs regressions is statistically significant, but with a wrong sign.

effect on output volatility. Thus, exclusion of these instruments from the IV regressions appears to be valid, as they affect the outcomes of interest only through entry costs (and, possibly, property rights). Other included instruments have no effect on output volatility, which strengthens our argument that entry costs are a primary institutional determinant of output volatility.

4.6 Initial Conditions

Often, initial conditions are included in the growth regressions to control for convergence effects. In our context, initial conditions might be relevant also because poorer countries have higher output volatility (see Acemoglu and Zilibotti, 1997).

In Table 3C we perform the benchmark regressions with the initial level of output per worker added as an included instrument. The results on entry costs and property rights remain essentially unchanged. The initial level of output per worker is insignificant in all regressions.

4.7 Outliers, "New Europe", and Africa Dummy

In Columns 1-3 of Table 3D we perform the benchmark regressions with entry costs and the debt recovery rate as endogenous regressors and settler mortality, population density, and the European languages variable as instruments. The Column 1 regressions differ from those in Column 1 of Table 3B only in one aspect, namely that the outliers (i.e., countries with entry costs above 500% of GNI) are dropped. The Column 2 regressions do not include "New Europe" (Australia, Canada, New Zealand, and USA). The Column 3 regressions control for the African continent.

The entry cost coefficient is statistically significant, except in the regression with Africa dummy. However, in that regression, the p-value of Cragg and Donald test is 0.22.

Columns 4-6 report the same regressions as those in Column 1-3, except that instead of the European languages variable, latitude is used as an instrument. Here, entry costs are significant in all three regression, but the p-values of Cragg and Donald's test are higher.

Table 3E offers identical analysis, except we use constraint on executive rather than the debt recovery rate as a proxy for property rights. The entry costs coefficients are significant and constraint on executive is insignificant in all regressions. The null of the insufficient rank test is rejected at the 10% level in all regressions. The null hypothesis of over-identification test is not rejected.

4.8 Summary of Statistical Robustness Checks

In sum, the effect of entry costs on output volatility is statistically and economically significant and this result is not driven by an omission of human capital, corruption or business regulation from the regressions. Moreover, the instruments, in particular, those correlated with entry costs, do not have an independent effect on output volatility. Once entry costs are controlled for, property rights appear to have no effect on output volatility.

While in the exercises above we find no indication that an omitted endogenous regressor biases the results, such possibility cannot be excluded with certainty. It could be that entry costs and property rights (almost) fully capture the effect of other institutions that are correlated with the instruments and affect output volatility. In such a case, the results here should be interpreted as strong evidence for the existence of a set of institutions that are very much distinct from those related to property rights and that affect output volatility. Entry costs should be viewed as a good proxy for this set of institutions.

4.9 Other Volatility Measures

We also investigate whether entry costs affect the magnitude of economic downturns. In Table 3F, we perform regressions identical to those in Table 3B, except the outcome of interest is the worst drop in output. The latter is computed as the minimum growth rate of output per worker.

The results of these regressions are in accord with our previous findings: entry costs have a strong effect on the severity of economic crises in all regressions; property rights protection does not a significant effect in any regression. The null of Cragg and Donald's test is not

rejected (at the 10% level) in seven out of ten regressions. The null of the over-identification test is not rejected in any regression.

The magnitude of the effect of entry costs on the severity of the economic crisis is very large. The average value of the entry costs coefficient in the ten regressions reported in Table 3F is 5.93. This implies that an increase in entry costs by one standard deviation in our sample, results in a 7.92 percentage points increase in size of the worst output drop, which is about 60% of its mean value in our sample.

5 Conclusions

Understanding the reasons behind cross-country differences in economic outcomes remains a primary goal of economics. Although recent advances in the literature have identified institutions as major determinants of economic outcomes, little is known about the role and relative importance of specific institutions. We find that entry regulation is an important determinant of output volatility, while property rights protection is not. These results strengthen the view that entry costs are an important institutional feature and that the effect of institutions on economy occurs via their impact on industry structure (see e.g., Nickell, 1996; Acemoglu, Johnson, Robinson, and Tchaicharoedn, 2003; Nicoletti and Scarpetta, 2003; Bastos and Nasir, 2004; Sivadasan, 2003; Alesina, Ardagna, Nicoletti, and Schiantarelli, 2005; Bruhn, 2008; Djankov, Ganser, McLiesh, Ramalho, and Shleifer, 2008; Barseghyan, 2008).

For policymakers looking for well-defined strategies to stabilize the economies of less developed countries, our paper provides an additional argument for the elimination of entry barriers: The estimated effect of such a policy is a sizable decrease in volatility.

Appendix: Data Sources and Definitions

1. Entry costs: The World Bank (2004, 2005, 2006a,b, 2007).[14] Entry costs are constructed for "a 'standardized' firm which has the following characteristics: 1) it performs general industrial or commercial activities, it operates in the largest city (by population), 2) it is exempt from industry-specific requirements (including environmental ones), it does not participate in foreign trade and does not trade in goods that are subject to excise taxes (e.g., liquor, tobacco, gas), it is a domestically-owned limited liability company, 3) its capital is subscribed in cash (not in-kind contributions) and is the higher of (i) 10 times GDP per capita in 1999 or (ii) the minimum capital requirement for the particular type of business entity, it rents (i.e., does not own) land and business premises, it has between 5 and 50 employees one month after the commencement of operations, all of whom are nationals, it has turnover of up to 10 times its start-up capital, and it does not qualify for investment incentives."

2. Debt recovery rate: The World Bank (2004, 2005, 2006a,b, 2007). The recovery rate is recorded as cents on the dollar recovered by claimants—creditors, tax authorities and employees—through the bankruptcy proceedings. The calculation takes into account whether the business is kept as a going concern during the proceedings, as well as bankruptcy costs and the loss in value due to the time spent closing down.

3. PPP adjusted GDP per worker: Penn World Tables 6.2.[15]

4. Constraint on executive power: Polity IV Project Jaggers and Marshall (2000).[16] This variable "refers to the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectivities," and takes values from 1 to 7, where 1 is unlimited authority; 3 - slight to moderate limitations; 5 - substantial limitations;7 - executive parity (between the executive(s) and accountability groups)

[14] Available at http://www.doingbusiness.org/.

[15] Available at http://pwt.econ.upenn.edu/.

[16] Available at http://www.systemicpeace.org/polity/polity4.htm.

or subordination. For more details see the Polity IV Project manual.

5. Property rights protection index: the Heritage Foundation's 2006 Index of Economic Freedom data set.[17] From 1 to 5 (in the regressions, the scale is reversed, e.g., 5 = 1 and 1 = 5):

   1- Private property guaranteed by government; court system efficiently enforces contracts; justice system punishes those who unlawfully confiscate private property; corruption nearly nonexistent, and expropriation highly unlikely.

   2- Private property guaranteed by government; court system suffers delays and is lax in enforcing contracts; corruption possible but rare; expropriation unlikely.

   3- Court system inefficient and subject to delays; corruption may be present; judiciary may be influenced by other branches of government; expropriation possible but rare.

   4- Property ownership weakly protected; court system inefficient; corruption present; judiciary influenced by other branches of government; expropriation possible.

   5- Private property outlawed or not protected; almost all property belongs to the state; country in such chaos (for example, because of ongoing war) that property protection nonexistent; judiciary so corrupt that property not effectively protected; expropriation frequent.

   The index is constructed based on the following factors: (i) freedom from government influence over the judicial system; (ii) commercial code defining contracts; (iii) sanctioning of foreign arbitration of contract disputes; (iv) government expropriation of property; (v) corruption within the judiciary; (vi) delays in receiving judicial decisions and/or enforcement; and (vii) legally granted and protected private property.

6. Protection against expropriation risk: Acemoglu, Johnson, and Robinson (2001). Risk of expropriation of private foreign investment, from 0 to 10. Higher score means less

[17] Available at http://www.heritage.org/Index/.

risk. Original source: Political Risk Services (September 1999).

7. Social infrastructure: Hall and Jones (1999). They constructed it as an average of the openness to trade index and the GADP index. Openness to trade index was taken from Sachs and Warner (1995). GADP index is an equal weighted average of five indices: (i) law and order, (ii) bureaucratic quality, (iii) corruption, (iv) risk of expropriation, and (v) government repudiation of contracts. All of these were taken from Political Risk Services.

8. European settlers' mortality: Acemoglu, Johnson, and Robinson (2001). Estimated mortality for European settlers during early period of European colonization (before 1850).

9. Population density in 1500: Acemoglu, Johnson, and Robinson (2002). Indigenous population density in 1500, inhabitants per square kilometer.

10. Fraction of population speaking a major European language: Hall and Jones (1999) based on Gunnemark (1991) and Hunter (1992).

11. Latitude: La Porta, Lopez de Silanes, Shleifer, and Vishny (1999). The absolute value of the latitude of the country, scaled to take values between 0 and 1. Original Source: CIA Factbook.

12. Government corruption variable: La Porta, Lopez de Silanes, Shleifer, and Vishny (1999). "Low ratings indicates 'high government officials are likely to demand special payments' and 'illegal payments are generally expected through lower levels of government' in the form of bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans." Scale 0 to 10. Average value over 1972-1995. Original Source: International Country Risk Guide.

13. Business regulation: La Porta, Lopez de Silanes, Shleifer, and Vishny (1999). From 1 to 5. The index is constructed based on the following factors: (1) licensing requirements

to operate a business; (ii) ease of obtaining a business license; (iii) corruption within the bureaucracy; (iv) labor regulations, such as established work-weeks, paid vacations, and parental leave, as well as selected labor regulations; (v) environmental, consumer safety, and worker health regulations; and (vi) regulations that impose a burden on business. Original Source: the Heritage Foundation's Index of Economic Freedom data set.

14. Moments of the distribution of employment by size class across countries: Alfaro, Charlton, and Kanczuk (2009). This data is constructed from micro-data collected in Dun & Bradstreet's WorldBase. The unit of observation is the plant.

For our cross-sectional study, only one observation is needed for each of the variables above. For entry costs and the debt recovery rate we take the average over the five years (2004-2008) for which data are available. For the constraint on executive variable and the property rights index, we average over the last ten years in which they were reported: 1994-2003 and 1996-2005, respectively. For the expropriation risk variable we use the average over 1985-1995.

Ideally, one would take the averages over the same period of time for all variables. Unfortunately, this is not possible due to data limitations. For some countries data for one or more years might be missing. We ignore these years when constructing averages.[18]

[18] When constructing the averages for constraint on executive, interregnum and transitional periods are ignored, except for Congo (Kinshasa). Because for this country all years between 1994 and 2003 were classified as interregnum or transitional, we use the value for year 1991, the last year for which constraint on executive was recorded.

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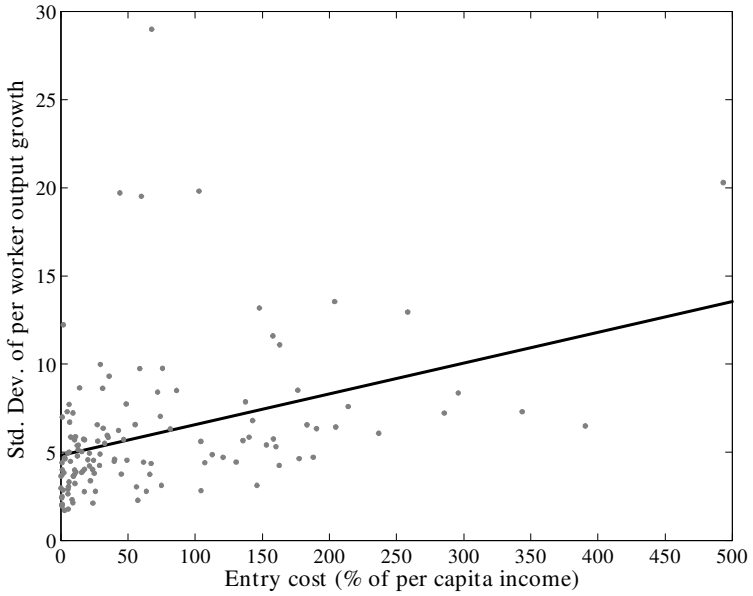

Figure 1: Volatility and entry costs: data and linear fit line (slope 1.74, p-value 0.000). Two outliers (entry costs > 500% of GNI) exluded.

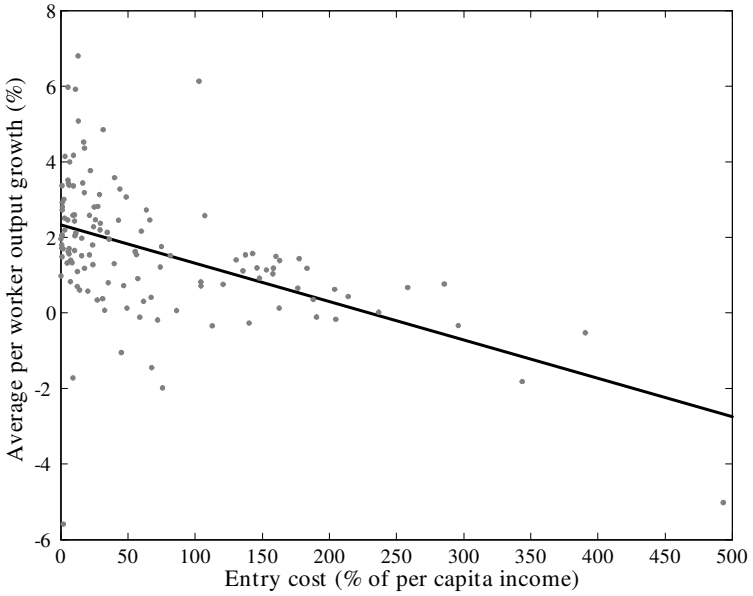

Figure 2: Growth and entry costs: data and linear fit line (slope -1.01, p-value 0.000). Two outliers (entry costs > 500% of GNI) exluded.

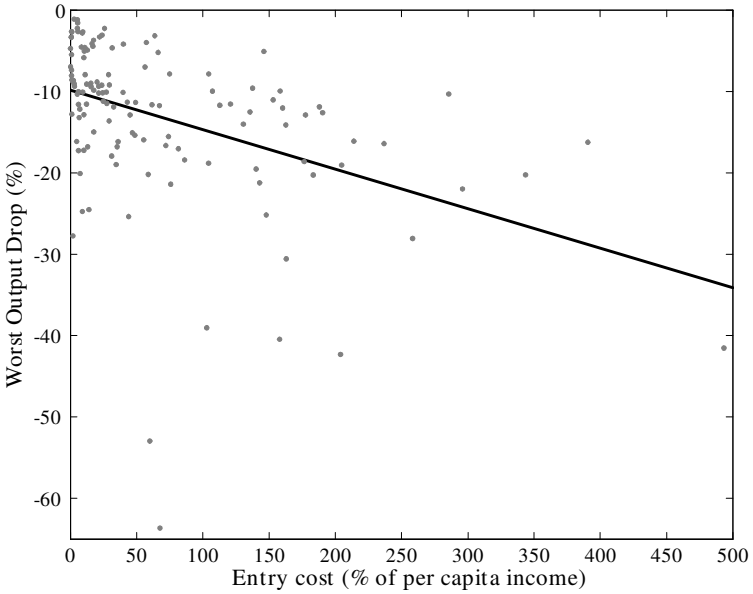

Figure 3: Crises and entry costs: data and linear fit line (slope -4.85, p-value 0.000). Two outliers (entry costs > 500% of GNI) exluded.

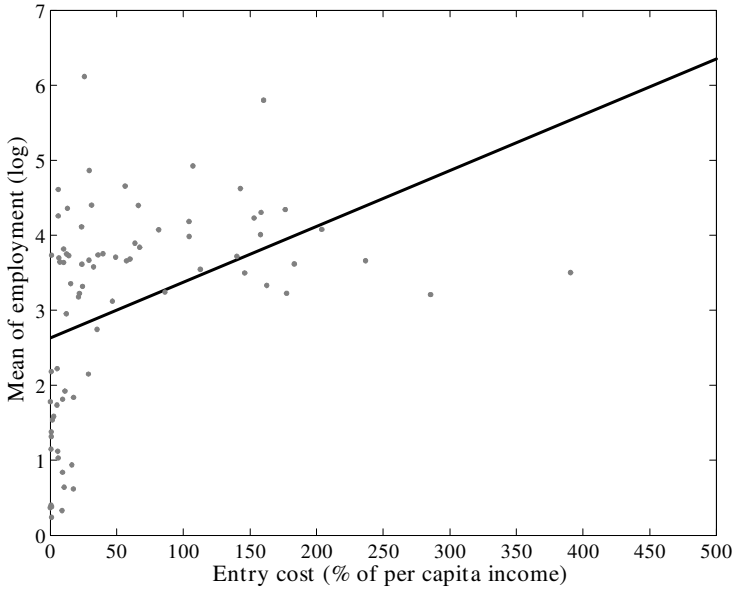

Figure 4: Average firms' size and entry costs: data and linear fit line (slope 0.74, p-value 0.001).

One outlier (entry costs > 500% of GNI) exluded.

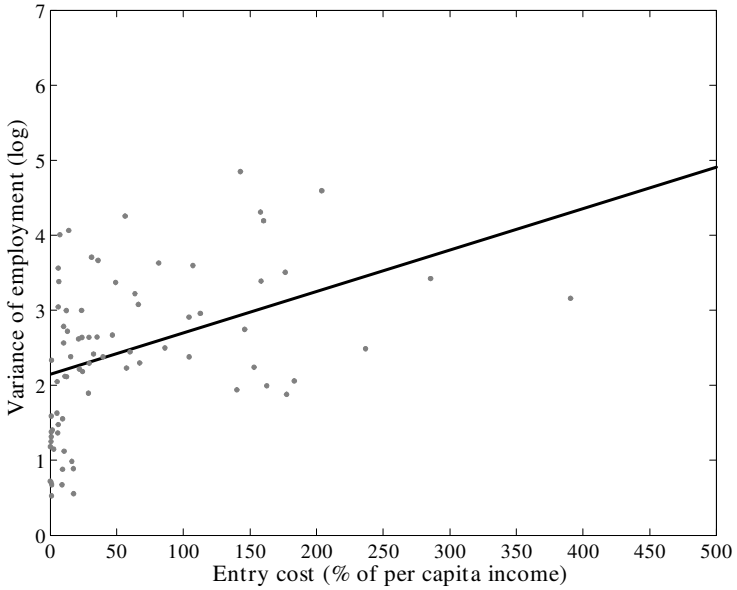

Figure 5: Variance of firms' size and entry costs: data and linear fit line (slope 0.55, p-value 0.001).

One outlier (entry costs > 500% of GNI) exluded.

Table 1. Descriptive Statistics and Correlations of Macro Variables, Institutions, and Moments of the Distribution of Firms.

	Observ.	*Sample Average*	*Standard Dev.*	*Correlations*										
				Std. dev. gr. rate	Worst Output Drop	Average gr. Rate	Entry Costs	Debt Recovery Rate	Constraint on Executive	Heritage Foundation Index	Expro-priation Risk	Social Infra-Structure	Average Firms' Size	Variance of firms' size
Std. dev. of growth rate	132	6.02	4.01	1.00										
Worst Output Drop	132	-13.23	9.64	-0.90	1.00									
Average growth rate	132	1.58	1.85	-0.30	0.43	1.00								
Entry Costs	132	79.45	133.51	0.26	-0.32	-0.48	1.00							
Debt Recovery Rate	132	31.97	26.59	-0.44	0.45	0.34	-0.41	1.00						
Constraint on Executive	132	4.83	1.99	-0.52	0.51	0.35	-0.40	0.51	1.00					
Heritage Foundation Index	112	3.20	1.11	-0.30	0.41	0.38	-0.46	0.79	0.58	1.00				
Expropriation Risk	59	6.52	1.51	-0.22	0.33	0.50	-0.32	0.59	0.36	0.73	1.00			
Social Infrastructure	117	0.51	0.49	-0.16	0.20	0.15	-0.22	0.37	0.36	0.85	0.73	1.00		
Average firms' size	79	3.07	1.38	0.42	-0.39	-0.30	0.23	-0.73	-0.53	-0.75	-0.64	-0.79	1.00	
Variance of firms' size	79	2.47	1.17	0.41	-0.41	-0.26	0.14	-0.61	-0.56	-0.65	-0.39	-0.68	0.84	1.00

Table 2. Assessing Instruments: OLS Regressions of Endogenous Regressors on Instruments.

Instruments	***Endogenous Regressors***					
	Entry Costs	Debt Recovery Rate	Constraint on Executive	Heritage Foundation Index	Expro-priation Risk	Social Infra-Structure
Latitude	-126.13	31.03	2.77	1.74	1.71	0.02
(Robust S. E.)	(99.63)	(20.03)	(1.19)	(0.70)	(1.20)	(0.21)
p-value	*0.21*	*0.13*	*0.02*	*0.02*	*0.16*	*0.93*
European Languages	-115.55	-2.20	2.55	0.29	0.42	0.00
	(40.97)	(9.43)	(0.50)	(0.28)	(0.38)	(0.06)
	0.01	*0.82*	*0.00*	*0.31*	*0.27*	*0.96*
British Legal Origin	0.43	11.59	0.31	0.63	0.77	0.07
	(65.94)	(5.14)	(0.35)	(0.18)	(0.34)	(0.04)
	1.00	*0.03*	*0.38*	*0.00*	*0.03*	*0.10*
Log Population Density	-19.44	-2.81	-0.05	-0.18	-0.19	-0.05
	(9.12)	(1.99)	(0.14)	(0.07)	(0.11)	(0.01)
	0.04	*0.16*	*0.74*	*0.02*	*0.09*	*0.00*
Log Settler Mortality	53.19	-6.69	-0.11	-0.15	-0.30	-0.06
	(26.92)	(2.07)	(0.17)	(0.08)	(0.16)	(0.02)
	-0.05	*0.00*	*0.54*	*0.08*	*0.07*	*0.00*
Observations	61	61	60	58	61	61
R-squared	0.25	0.46	0.56	0.60	0.41	0.52

Table 3A. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker on Entry Costs and a Measure of Property Rights.

	Debt Recovery Rate 1	Heritage Foundation Index 2	Social Infra-Structure 3	Debt Recovery Rate 4	Heritage Foundation Index 5	Social Infra-Structure 6
	Instruments: Legal Origin and European Languages			**Instruments: Legal Origin and Latitude**		
	Dependent Variable: Std. dev. of Growth Rate			***Dependent Variable: Std. dev. of Growth Rate***		
Entry Costs	1.64	1.68	1.53	1.56	1.10	1.14
(Robust S. E.)	(0.58)	(0.77)	(0.57)	(0.94)	(1.00)	(0.62)
p-value	*0.00*	*0.03*	*0.01*	*0.10*	*0.27*	*0.07*
The Measure of Property Rights	-0.03	-0.56	-2.95	-0.03	-0.59	-3.56
	(0.01)	(0.40)	(1.33)	(0.02)	(0.54)	1.33
	0.05	*0.16*	*0.03*	*0.19*	*0.28*	*0.01*
Insufficient Rank	0.07	0.20	0.23	0.36	0.35	0.29
Observations	121	110	113	123	111	113

Table 3B. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker on Entry Costs and a Measure of Property Rights.

	Debt Recovery Rate 1	Constraint on Executive 2	Heritage Foundation Index 3	Expro-priation Risk 4	Social Infra-Structure 5	Debt Recovery Rate 6	Constraint on Executive 7	Heritage Foundation Index 8	Expro-priation Risk 9	Social Infra-Structure 10
	Instruments: Settler Mortality, Population Density and European Languages					**Instruments: Settler Mortality, Population Density and Latitude**				
	Dependent Variable: Std. Dev. of Growth Rate					***Dependent Variable: Std. Dev. of Growth Rate***				
Entry Costs	1.47	2.03	1.64	1.62	1.61	2.17	1.93	1.91	2.07	2.04
(Robust S. E.)	(0.62)	(0.85)	(0.71)	(0.66)	(0.63)	(0.94)	(0.79)	(0.89)	(0.85)	(0.78)
p-value	*0.02*	*0.02*	*0.02*	*0.01*	*0.01*	*0.02*	*0.01*	*0.03*	*0.02*	*0.01*
The Measure of Property Rights	-0.01	0.29	-0.02	-0.04	-0.30	0.02	0.07	0.21	0.25	1.51
	(0.03)	(0.28)	(0.45)	(0.40)	(1.89)	(0.04)	(0.26)	(0.47)	(0.46)	(2.29)
	0.60	*0.29*	*0.96*	*0.92*	*0.87*	*0.60*	*0.80*	*0.66*	*0.60*	*0.51*
Insufficient Rank	0.04	0.06	0.03	0.10	0.01	0.43	0.08	0.11	0.24	0.05
Over-Identification	0.25	0.57	0.85	0.23	0.23	0.62	0.61	0.98	0.61	0.72
Observations	59	58	56	59	59	59	58	56	59	59

Table 3C. IV Regressions of Std. Dev. of Growth Rate of Output per Worker on Entry Costs, Initial Output per Worker, and a Measure of Property Rights.

	Debt Recovery Rate 1	Constraint on Executive 2	Heritage Foundation Index 3	Expro-priation Risk 4	Social Infra-Structure 5	Debt Recovery Rate 6	Constraint on Executive 7	Heritage Foundation Index 8	Expro-priation Risk 9	Social Infra-Structure 10
	Instruments: Settler Mortality, Population Density and European Languages					**Instruments: Settler Mortality, Population Density and Latitude**				
	Dependent Variable: Std. Dev. of Growth Rate					***Dependent Variable: Std. Dev. of Growth Rate***				
Entry Costs	1.64	2.01	1.62	1.57	1.69	2.04	1.82	1.87	2.75	2.17
(Robust S. E.)	(0.73)	0.82	(0.78)	(0.82)	(0.70)	(1.65)	(0.77)	(0.86)	(1.33)	(0.83)
p-value	*0.03*	*0.02*	*0.04*	*0.06*	*0.02*	*0.22*	*0.02*	*0.03*	*0.04*	*0.01*
Initial Value of Output per Worker	0.10	0.03	0.08	0.20	0.10	0.08	0.14	0.04	-0.15	0.06
	(0.08)	(0.07)	(0.17)	(0.20)	(0.10)	(0.23)	(0.09)	(0.22)	(0.36)	(0.11)
	0.20	*0.71*	*0.63*	*0.32*	*0.33*	*0.74*	*0.12*	*0.84*	*0.69*	*0.56*
The Measure of Property Rights	-0.04	0.18	-0.70	-1.14	-3.11	-0.01	-0.67	-0.17	1.64	0.24
	(0.04)	(0.41)	(1.58)	(1.44)	(4.38)	(0.17)	(0.62)	(2.26)	(2.63)	(4.54)
	0.38	*0.67*	*0.66*	*0.43*	*0.48*	*0.96*	*0.28*	*0.94*	*0.53*	*0.96*
Insufficient Rank	0.03	0.06	0.05	0.38	0.01	0.82	0.10	0.30	0.68	0.04
Over-Identification	0.85	0.93	0.64	0.79	0.63	0.31	0.62	0.88	0.68	0.34
Observations	59	58	56	59	59	59	58	56	59	59

Table 3D. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker on Entry Costs and the Debt Recovery Rate: Sample Issues.

	Base Sample without Outliers 1	Base Sample without New Europe 2	Base Sample with Africa Dummy 3	Base Sample without Outliers 4	Base Sample without New Europe 5	Base Sample with Africa Dummy 6
	Instruments: Settler Mortality, Population Density and European Languages			**Instruments: Settler Mortality, Population Density and Latitude**		
	Dependent Variable: Std. Dev. of Growth Rate			***Dependent Variable: Std. Dev. of Growth Rate***		
Entry Costs	2.13	1.35	1.11	2.82	2.06	2.04
(Robust S. E.)	(0.96)	(0.62)	(0.69)	(1.44)	(1.13)	(0.96)
p-value	*0.03*	*0.03*	*0.11*	*0.05*	*0.07*	*0.03*
Debt Recovery Rate	-0.02	-0.02	-0.02	0.00	0.04	0.01
	(0.03)	(0.05)	(0.03)	(0.04)	(0.09)	(0.03)
	0.55	*0.63*	*0.53*	*0.89*	*0.65*	*0.64*
Insufficient Rank	0.00	0.09	0.22	0.17	0.51	0.39
Over-Identification	0.32	0.21	0.08	0.29	0.33	0.90
Observations	57	55	57	57	55	57

Table 3E. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker on Entry Costs and Constraint on Executive: Sample Issues.

	Base Sample without Outliers 1	Base Sample without New Europe 2	Base Sample with Africa Dummy 3	Base Sample without Outliers 4	Base Sample without New Europe 5	Base Sample with Africa Dummy 6
	Instruments: Settler Mortality, Population Density and European Languages			**Instruments: Settler Mortality, Population Density and Latitude**		
	Dependent Variable: Std. Dev. of Growth Rate			***Dependent Variable: Std. Dev. of Growth Rate***		
Entry Costs	2.90	2.04	1.60	2.71	1.99	1.80
(Robust S. E.)	(1.15)	(0.89)	(0.79)	(1.11)	(0.80)	(0.80)
p-value	*0.01*	*0.02*	*0.04*	*0.02*	*0.01*	*0.02*
Constraint on Executive	0.25	0.43	0.69	-0.04	0.29	0.02
	0.29	(0.31)	(0.44)	(0.28)	(0.37)	(0.35)
	0.38	*0.16*	*0.12*	*0.90*	*0.43*	*0.96*
Insufficient Rank	0.00	0.07	0.07	0.00	0.09	0.08
Over-Identification	0.87	0.88	0.38	0.34	0.14	0.79
Observations	56	54	56	56	54	56

Table 3F. IV Regressions of Largest Drop of Output per Worker on Entry Costs and a Measure of Property Rights.

	Debt Recovery Rate	Constraint on Executive	Heritage Foundation Index	Expro-priation Risk	Social Infra-Structure	Debt Recovery Rate	Constraint on Executive	Heritage Foundation Index	Expro-priation Risk	Social Infra-Structure
	1	2	3	4	5	6	7	8	9	10
	Instruments: Settler Mortality, Population Density and European Languages					**Instruments: Settler Mortality, Population Density and Latitude**				
	Dependent Variable: Largest Output Drop					***Dependent Variable: Largest Output Drop***				
Entry Costs	-4.21	-6.57	-5.08	-4.89	-4.82	-7.35	-6.23	-6.76	-6.82	-6.59
(Robust S. E.)	(1.94)	(2.78)	(2.29)	(2.16)	(2.01)	(3.42)	(2.63)	(3.04)	(3.08)	(2.64)
p-value	*0.03*	*0.02*	*0.03*	*0.02*	*0.02*	*0.03*	*0.02*	*0.03*	*0.03*	*0.01*
The Measure of Property Rights	0.05	-1.30	0.15	0.01	0.56	-0.10	-0.54	-1.31	-1.24	-6.86
	(0.08)	(1.02)	(1.56)	(1.31)	(6.14)	(0.14)	(1.01)	(1.82)	(1.79)	(8.23)
	0.51	*0.20*	*0.93*	*1.00*	*0.93*	*0.47*	*0.59*	*0.47*	*0.49*	*0.40*
Insufficient Rank	0.04	0.06	0.03	0.10	0.01	0.43	0.08	0.11	0.24	0.05
Over-Identification	0.18	0.44	0.10	0.13	0.13	0.66	0.56	0.97	0.65	0.80
Observations	59	58	56	59	59	59	58	56	59	59

Table 4. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker with Human Capital as an Endogenous Regressor.

	1	2	3
		Dependent Variable: Std. Dev. of Growth Rate	
Entry Costs	1.94	1.89	1.82
(Robust S. E.)	(0.81)	1.09	(0.90)
p-value	*0.02*	*0.08*	*0.04*
Human Capital	0.12	0.19	-0.31
	(0.21)	(0.67)	(0.45)
	0.56	*0.78*	*0.50*
Debt Recovery Rate		-0.01	
		(0.10)	
		0.90	
Constraint on Executive			0.79
			(0.71)
			0.27
Insufficient Rank	0.05	0.06	0.04
Observations	49	49	49

Notes: In Column 1 regressions the instruments are Settler Mortality and Population Density.
In Column 2 regressions the instruments are Settler Mortality, Population Density, and Legal Origin.
In Column 3 regressions the instruments are Settler Mortality, Population Density, and European Languages.

Table 5. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker with Corruption as an Endogenous Regressor.

	1	2	3
		Dependent Variable: Std. Dev. of Growth Rate	
Entry Costs	1.94	1.82	1.99
(Robust S. E.)	(0.77)	(1.74)	(0.84)
p-value	*0.01*	*0.30*	*0.02*
Corruption	0.12	0.19	-0.23
	(0.21)	(0.81)	(0.34)
	0.57	*0.81*	*0.49*
Debt Recovery Rate		-0.01	
		(0.12)	
		0.92	
Constraint on Executive			0.44
			(0.38)
			0.25
Insufficient Rank	0.01	0.08	0.02
Observations	59	59	58

Notes: In Column 1 regressions the instruments are Settler Mortality and Population Density.
In Column 2 regressions the instruments are Settler Mortality, Population Density, and Legal Origin.
In Column 3 regressions the instruments are Settler Mortality, Population Density, and European Languages.

Table 6. IV Regressions of Avg. and Std. Dev. of Growth Rate of Output per Worker with Business Regulation as an Endogenous Regressor.

	1	2	3
		Dependent Variable: Std. Dev. of Growth Rate	
Entry Costs	2.00	1.82	2.00
(Robust S. E.)	(0.83)	(1.95)	(0.88)
p-value	*0.02*	*0.35*	*0.02*
Business Regulation	0.30	0.56	-0.64
	(0.51)	(2.20)	(0.95)
	0.56	*0.80*	*0.50*
Debt Recovery Rate		-0.02	
		(0.13)	
		0.89	
Constraint on Executive			0.44
			(0.40)
			0.27
Insufficient Rank	0.03	0.12	0.02
Observations	57	57	56

Notes: In Column 1 regressions the instruments are Settler Mortality and Population Density.
In Column 2 regressions the instruments are Settler Mortality, Population Density, and Legal Origin.
In Column 3 regressions the instruments are Settler Mortality, Population Density, and European Languages.

Tables 7A-&B. Semi-Reduced Form Regressions.

	Table 7A				Table 7B			
	1	2	3	4	1	2	3	4
	Dependent Variable: Std. Dev. of Growth Rate				*Dependent Variable: Std. Dev. of Growth Rate*			
Entry Costs	1.83	1.93	1.74	1.84	1.32	1.06	1.19	0.99
(Robust S.E.)	(0.74)	(0.81)	(0.77)	(0.84)	(0.59)	(0.65)	(0.61)	(0.66)
p-value	*0.01*	*0.02*	*0.02*	*0.03*	*0.02*	*0.10*	*0.05*	*0.13*
Log Population Density	-0.07	0.03	-0.08	0.81	0.01	-0.09	-0.04	-0.11
	(0.12)	(0.16)	(0.12)	(0.84)	(0.13)	(0.11)	(0.12)	(0.11)
	0.56	*0.84*	*0.50*	*0.34*	*0.94*	*0.42*	*0.74*	*0.32*
European Languages		0.87		0.01				
		(0.85)		(0.17)				
		0.31		*0.94*				
Settlers Mortality						0.47		0.41
						(0.39)		(0.37)
						0.23		*0.26*
Latitude			-1.18	-1.25			-3.03	-2.25
			(2.19)	(2.25)			(2.34)	(1.98)
			0.59	*0.58*			*0.20*	*0.26*
Insufficient Rank	0.00	0.00	0.00	0.01	0.01	0.07	0.03	0.08
Observations	59	59	59	59	59	59	59	59

Notes: Entry Costs are instrumented by Settler Mortality in Table 7A and by European Languages in Table 7B.
In Column 1 Population Density is added as an included instrument. In Column 2 included instruments are Settlers Mortality and Population Density.
In Column 3 included instruments are Latitude and Population Density. In Column 4 included instruments are Settlers Mortality, Latitude, and Population Density.